## Joyansoo Ingoon

## WHAT IS CLAIMED IS:

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1. A method performed by a computer for computing modified discrete cosine transfer comprising the steps of:

computing 
$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for } 0 \le k \le 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for } 9 \le k \le 17 \end{cases}$$

computing 
$$Y'(n) = \sum_{k=0}^{17} x(k) \cos[\frac{\pi}{36} (2k+1)n]$$
 for  $0 \le n \le 17$ ;

defining 
$$Y(0) = Y'(0)/2$$
; and

computing 
$$Y(n) = Y'(n) - Y(n-1)$$
 for  $1 \le n \le 17$ .

2. An MPEG encoder/decoder comprising:

means for computing 
$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for } 0 \le k \le 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for } 9 \le k \le 17 \end{cases}$$
;

means for computing 
$$Y'(n) = \sum_{k=0}^{17} x(k) \cos[\frac{\pi}{36}(2k+1)n]$$
 for  $0 \le n \le 17$ ;

means for defining 
$$Y(0) = Y'(0)/2$$
; and

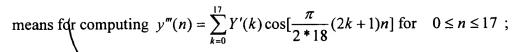
means for computing 
$$Y(n) = Y'(n) - Y(n-1)$$
 for  $1 \le n \le 17$ .

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3. The encoder/decoder of claim 2, further comprising:

means for computing 
$$Y'(k) = Y(k) \cdot b_k$$
 for  $0 \le k \le 17$ ;

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means for computing 
$$y'(n) = \begin{cases} y'''(n+9) & \text{for } 0 \le n \le 8 \\ 0 & \text{for } n=9 \\ -y'''(27-n) & \text{for } 10 \le n \le 26 \\ -y'''(n-27) & \text{for } 27 \le n \le 35 \end{cases}$$

means for defining  $y(0) = \sum_{k=0}^{18-1} Y(k) \cdot c_k$ ; and

means for computing y(n) = y'(n) - y(n-1) for  $1 \le n \le 35$ .

4. An electronic circuit for fast computation of modified inverse discrete cosine transform comprising:

a first circuit for computing

$$x(k) = \begin{cases} [-y(26-k) - y(27+k)] \cdot b_k & \text{for} \quad 0 \le k \le 8 \\ [y(k-9) - y(26-k)] \cdot b_k & \text{for} \quad 9 \le k \le 17 \end{cases};$$

a second circuit for computing  $Y'(n) = \sum_{k=0}^{17} x(k) \cos[\frac{\pi}{36}(2k+1)n]$  for  $0 \le n \le 17$ ;

- a third circuit for defining Y(0) = Y'(0)/2; and
- a fourth circuit for computing Y(n) = Y'(n) Y(n-1) for  $1 \le n \le 17$ .
- 5. A method performed by a computer for computing modified inverse discrete cosine
- 15 transform comprising the steps of:

computing  $Y'(k) = Y(k) \cdot b_k$  for  $0 \le k \le 17$ ;

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computing 
$$y'''(n) = \sum_{k=0}^{17} Y'(k) \cos[\frac{\pi}{2*18}(2k+1)n]$$
 for  $0 \le n \le 17$ ;

computing 
$$y''(n) = \begin{cases} y'''(n+9) & \text{for } 0 \le n \le 8 \\ 0 & \text{for } n=9 \\ -y'''(27-n) & \text{for } 10 \le n \le 26 \end{cases};$$

$$y'''(n) = \begin{cases} y'''(n+9) & \text{for } 0 \le n \le 8 \\ -y'''(n-27) & \text{for } 10 \le n \le 35 \end{cases};$$

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$$y'''(n) = \begin{cases} y''''(n+9) & \text{for } 0 \le n \le 35 \\ -y''''(n+9) & \text{for } 0 \le n \le 35 \end{cases};$$

$$y'''(n) = \begin{cases} y''''(n+9) & \text{for } 0 \le n \le 35 \\ -y''''(n+9) & \text{for } 0 \le n \le 35 \end{cases};$$

computing y(n) = y'(n) - y(n-1) for  $1 \le n \le 35$ .

6. An electronic circuit for fast computation of computing modified inverse discrete cosine transform comprising:

a first circuit for computing  $Y'(k) = Y(k) \cdot b_k$  for  $0 \le k \le 17$ 

a second circuit for computing  $y'''(n) = \sum_{k=0}^{17} Y'(k) \cos\left[\frac{\pi}{2*18}(2k+1)n\right]$  for  $0 \le n \le 17$ 

a third circuit for computing

$$y'(n) = \begin{cases} y'''(n+9) & \text{for } 0 \le n \le 8 \\ 0 & \text{for } n=9 \\ -y'''(27-n) & \text{for } 10 \le n \le 26 \\ -y'''(n-27) & \text{for } 27 \le n \le 35 \end{cases}$$

a fourth circuit for defining  $v(0) = \sum_{k=0}^{18-1} Y(k) \cdot c_k$ ; and

a fifth circuit for computing y(n) = y'(n) - y(n-1) for  $1 \le n \le 35$ .